

CLAIMS

What is claimed is:

- 1 1. A laser-programmable fuse structure for an integrated circuit device,
2 comprising:
3 a conductive layer, said conductive layer completing a conductive path
4 between wiring segments included in a wiring layer; and
5 an organic material encapsulated underneath said conductive layer;
6 wherein the fuse structure is blown open by application of a beam of laser
7 energy thereto.
- 1 2. The fuse structure of claim 1, further comprising:
2 a liner material in electrical contact with said wiring segments and said
3 conductive layer, said liner material further encapsulating said organic material between
4 said wiring layer and said conductive layer.
- 1 3. The fuse structure of claim 1, wherein said organic material is selected
2 from a group that includes a polyimide, a polyamide, a polyarylene ether, a polyaromatic
3 hydrocarbon (PAH), and a conductive polyaniline.
- 1 4. The fuse structure of claim 1, wherein said liner material is selected from a
2 group that includes TaN, Ta, TiN, Ti, W, WN, TaSiN, TiSiN, or alloys therefrom.

1 5. The fuse structure of claim 1, wherein said conductive layer is selected
2 from a group that includes TaN, Ta, TiN, Ti, W, WN, TaSiN, TiSiN, or alloys therefrom.

1 6. The fuse structure of claim 2, further comprising:
2 a pair of vias formed within an insulating layer and extending down to said
3 wiring segments; and
4 a mesa region of said insulating layer formed between said pair of vias;
5 wherein said liner material is formed upon sides of said mesa region and
6 said wiring segments.

1 7. The fuse structure of claim 6, wherein said pair of vias is filled with said
2 organic material.

1 8. The fuse structure of claim 7, wherein said organic material further
2 occupies an inner area of the fuse structure, said inner area between the top of said mesa
3 region and said conductive layer.

1 9. The fuse structure of claim 8, wherein said conductive layer covers said
2 inner area and said organic material, thereby completing said conductive path.

1 10. A method for forming a laser-programmable fuse structure for an
2 integrated circuit device, the method comprising:
3 forming a conductive layer to complete a conductive path between wiring
4 segments included in a wiring layer; and
5 encapsulating an organic material underneath said conductive layer;
6 wherein the fuse structure is blown open by application of a beam of laser
7 energy thereto.

1 11. The method of claim 10, further comprising:
2 forming a liner material in electrical contact with said wiring segments and
3 said conductive layer, said liner material further encapsulating said organic material
4 between said wiring layer and said conductive layer.

1 12. The method of claim 10, wherein said organic material is selected from a
2 group that includes a polyimide, a polyamide, a polyarylene ether, a polyaromatic
3 hydrocarbon (PAH), and a conductive polyaniline.

1 13. The method of claim 10, wherein said liner material is selected from a
2 group that includes TaN, Ta, TiN, Ti, W, WN, TaSiN, TiSiN, or alloys therefrom.

1 14. The method of claim 10, wherein said conductive layer is selected from a
2 group that includes TaN, Ta, TiN, Ti, W, WN, TaSiN, TiSiN, or alloys therefrom.

1 15. The method of claim 11, further comprising:
2 forming a pair of vias within an insulating layer, said vias extending down
3 to said wiring segments; and
4 a mesa region of said insulating layer thereby being formed between said
5 pair of vias;
6 wherein said liner material is formed upon sides of said mesa region and
7 said wiring segments.

1 16. The method of claim 15, further comprising filling said pair of vias with
2 said organic material.

1 17. The method of claim 16, wherein said organic material further occupies an
2 inner area of the fuse structure, said inner area between the top of said mesa region and
3 said conductive layer.

1 18. A laser-programmable fuse structure for an integrated circuit device,
2 comprising:
3 an electrically conductive organic material, said electrically conductive
4 organic material completing a conductive path between wiring segments included in a
5 wiring layer; and
6 said electrically conductive organic material further filling a pair of vias
7 formed within an insulating layer, said pair of vias extending down to said wiring
8 segments;
9 wherein the fuse structure is blown open by application of a beam of laser
10 energy to said electrically conductive organic material.